

Official Science on Saturday  
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**Student Notes**  
**Science on Saturday**  
*February 11, 2012*

*Sleuthing Seismic Signals: Understanding  
Earthquake Hazard and Monitoring Nuclear  
Explosions*

**Presenters:**

Dr. Sean Ford – Scientist – Lawrence Livermore National Laboratory

Ken Wedel – Science Teacher – Tracy High School, Tracy Unified School District

**Program Summary:**

You will see what an earthquake in the Bay Area would look like to understand its effects.

Just like an earthquake, a nuclear test can cause seismic disturbances that are recorded at monitoring stations around the world. You will learn how seismologists tell the difference between these two sources by sleuthing seismic signals.

**Student Lecture Notes:**

1. The intensity of an earthquake refers to the amount of ground shaking.  
(Circle the correct response)
  - a. True
  - b. False
  
2. What is the likelihood of a magnitude 6.7 or greater earthquake occurring in the Bay Area in the next 30 years? (Circle the correct response)
  - a. 3% chance
  - b. 12% chance
  - c. 63% chance
  - d. 100% chance

3. Describe what was illustrated by the audience jumping up and down?

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4. Which has more energy? (Circle the correct response)

- a. A wave with greater amplitude.
- b. A wave with a smaller amplitude.

5. What force must be overcome by the stress from the movement of tectonic plates so an earthquake can occur? (Circle the correct response)

- a. The force of the moon's gravity acting on rock formation.
- b. Friction between the rocks along the fault.
- c. Centripetal force of the spinning Earth.
- d. The calibrated force along the fault.

6. Explain why the exact time and intensity of earthquakes is difficult to predict?

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7. What was the last supercontinent called and how long ago did it exist?  
(Circle the correct response)

- a. Superland, 1 billion years ago.
- b. Gondwanaland, exactly 150 million years ago.
- c. Pangaea, about 500 million years ago.
- d. Pangaea, about 200 million years ago.

8. What type of plate boundary is the San Andres fault?

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9. What kind of motion occurs in a primary wave?

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10. How are the seismic waves of an explosion different than seismic waves of an earthquake?

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## **Presenter Bios:**



### **Dr. Sean Ford, Research Scientist Lawrence Livermore National Laboratory**

Sean Ford is a seismologist in the Ground-based Nuclear Detonation Detection Program, which is part of the Physical & Life Sciences Directorate at Lawrence Livermore National Laboratory. His primary research at LLNL involves understanding the seismic signature of the explosion source. Dr. Ford attended Foothill High School in Pleasanton, earned an A.B. in Geophysics from the University of California in 1999, an M.S. in Geological Sciences from Arizona State University in 2005, and a Ph.D. in Earth and Planetary Science from the University of California in 2008.



### **Mr. Ken Wedel, Science Teacher, Tracy High School Tracy Unified School District**

Ken Wedel teaches IB Environmental Systems and Societies and Earth Science at Tracy High School in Tracy, California. He developed the Earth Science program at Tracy High School, and has worked on curriculum mapping and curriculum alignment to the California State Standards for both high schools in Tracy. Ken has been advisor to the Tracy High School Science Olympiad competition team at the regional and state level for ten years and he has been inducted into the Science Olympiad Hall of Fame. Ken teaches at Lawrence Livermore National Lab's Teacher Research Academies during the summers. In addition he has worked as an intern in a laboratory at LLNL under the Department of Energy's ACTS program. In the past he has consulted with Action Learning Systems creating California Earth Science Standards-based benchmark tests. He earned his Bachelor of Science Degree in Geology from California State University, Stanislaus.